

Notice of Allowability

Application No.

09/695,414

Examiner

Evan Pert

Applicant(s)

ZHANG ET AL.

Art Unit

2826

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the Appeal Brief filed August 25, 2003.
2. ☒ The allowed claim(s) is/are 1-18.
3. ☒ The drawings filed on 25 December 2003 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/420,472.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

DETAILED ACTION

Final Rejection and Appeal Brief

1. The final rejection (2-25-03) appealed by applicant in the Appeal Brief filed 8-25-03 is withdrawn.

EXAMINER'S AMENDMENT

2. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

The application has been amended as follows, to correct grammatical informalities:

- At page 9, last paragraph, second line, change "heating a substrate in a chamber" to --heating the substrate in the chamber--.
- At page 9, second-to-last paragraph, first line, change "a substrate is taken out from a chamber" to --the substrate is taken out from the chamber--.
- Change the title to:

--Method of Forming Semiconductor Device by Crystallizing Amorphous Silicon and Forming Crystallization Promoting Material in the Same Chamber--.

Response to Arguments

3. Applicant argues that Liu et al. (US 5,147,826) do not disclose “a chamber,” even though they disclose “nickel or palladium” (i.e. catalyst) being “thermally evaporated onto material” effecting patterning using a “shadow mask” [Example 2 at cols. 5-6]:

Applicant’s argument that “there is no chamber in Liu et al.” is scientifically puzzling since “thermal evaporation” of “metal” is notoriously well known to involve a vacuum chamber [e.g. see US 2,414,406, US 2,450,850, US 3,617,373, or Maissel et al. (Handbook of Thin Film Technology)].

If somehow “a chamber” is not inherent in Liu et al. for the “thermally evaporating” the metal, the existence of a vacuum “chamber” is most definitely *implicit*.

4. Applicant argues that it is improper to practice the methodology disclosed by Liu et al. (US 5,147,826) with the apparatus disclosed by Turner et al. (US 5,512,320), yet Liu et al. discloses a process having separate steps of 1) CVD of a-Si, 2) metal deposition by thermal evaporation (i.e. evaporation to deposit on a substrate in a vacuum chamber) and 3) RTA, that are a collection of process steps advantageously performed in a “multi-chamber integrated process system,” of Maydan et al. for example, having vacuum process chambers and RTA (the Maydan et al. being incorporated by reference into Turner et al. per col. 1, lines 44-60 of Turner et al.).

Applicant’s argument is not convincing that the process of Liu et al. would not be obvious to practice in a multi-chamber process, such as disclosed by Turner et al. (i.e. the apparatus Maydan et al.):

The generalized multi-chamber process tool of Maydan et al., having vacuum and RTA process chambers, has clear advantages when practicing the method of Liu et al., such as “improved productivity,” “the concomitant advantage of a cleaner system,” and “increased throughput” [col. 1, lines 44-60 of Turner et al.].

Allowable Subject Matter

5. Claims 1-18 are allowed.

6. The following is an examiner's statement of reasons for allowance:

As now understood, the prior does not disclose or suggest applicant's method characterized by the claimed steps of “crystallizing” and “forming a crystallization promoting material” with both steps being successively performed in the *same* chamber (i.e. “continuously in the same chamber without taking out the substrate” per p. 6).

Applicant argues that Liu et al. do not disclose the limitation of “without...exposing to the air outside the chamber,” which the examiner now realizes is equivalent to “performed continuously in the [same] chamber without taking out the substrate” [specification, p. 6, 3rd paragraph]. In other words, as applicant puts it:

Stated differently, the step of forming the crystallization promoting material and the step of crystallizing the semiconductor film are conducted successively in [the] same chamber without exposing the semiconductor film and the crystallization promoting material to the air outside the chamber. [Appeal Brief, top of p. 4].

The Liu et al. reference suggests a step of thermally evaporating palladium and nickel and a step of RTA, both steps implicitly being performed in chambers, yet they do not suggest how to accomplish these different steps in the *same* chamber:

While a multi-chamber process tool would readily accommodate the different process steps of “thermally evaporating palladium” and “RTA” in Liu et al., by performing each step in a different chamber of the multi-chamber tool, a single chamber would not.

Notably, Applicant discloses that:

It is further desired that a multichamber system having a load chamber and an unload chamber is used instead of chamber 101, so that further throughput can be improved. [Specification, p. 12, 2nd paragraph, last sentence]

Therefore, applicant distinguishes a “multi-chamber system” from a single “chamber 101,” meaning that the allowed claims, which are limited to using “a chamber” in which both “crystallizing” and “forming a crystallization promoting material” take place, are not enforceable against “crystallizing” and “forming a crystallization promoting material” in a “multi-chamber integrated process system” *unless* the acts of “crystallizing” and “forming a crystallization promoting material” are performed in “the same chamber” of the multi-chamber system.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Evan Pert whose telephone number is 571-272-1969. The examiner can normally be reached on M-F (7:30AM-3:30 PM).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ETP
May 26, 2005


EVAN PERT
PRIMARY EXAMINER